IN THE CLAIMS

1. (Amended) An apparatus to align a tip of an optical fiber with a light source using translational movement along three perpendicular axes including a X axis, a Y axis, and a central axis, and a rotational movement around the central axis, the apparatus comprising:

C1

a fiber holder to receive a portion of the optical fiber;

a substantially tubular interface having the longitudinal central axis, a first open end to receive at least a portion of the fiber holder along the central axis and a second end that is positionable to receive light emitted by the light source; and

wherein the fiber holder is adjustable within the substantially tubular interface along the X axis, the Y axis, and the central axis, and is adjustable about the central axis.

2. (Amended) The apparatus of Claim 1, wherein the second end is positioned to receive light emitted by the light source placed within the second end between a heat sink and the fiber holder.

3. (Unchanged) The apparatus of Claim 2, wherein the light source comprises a laser diode.

4. (Amended) The apparatus of Claim 3, wherein the laser diode includes at least one connection by which the laser diode receives power, the interface including an aperture through which the at least one connection connects the laser diode to a power source.

5. (Amended) The apparatus of Claim 1, further comprising a lens aligned substantially perpendicular to the central axis, wherein the second end is positionable to receive light emitted by the light source through the lens.

6. (Amended) The apparatus of Claim 5, further comprising a lens holder, the lens holder including an inner surface to secure the lens and an outer surface to secure the lens holder with respect to the interface.

7. (Amended) The apparatus of Claim 1, wherein the fiber holder includes a substantially spherical portion having a center and a channel of sufficient dimension to receive the portion of the optical fiber, the channel located through the center of the substantially spherical portion of the fiber holder.

8. (Amended) The apparatus of Claim 7, wherein the fiber holder further comprises an annular groove around the circumference of the spherical portion, the annular groove capable of receiving bonding material to secure the portion of the fiber holder received within the interface.

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9. (Amended) The apparatus of Claim 7, wherein the fiber holder comprises at least one capillary gap, the capillary gap capable of receiving bonding material to secure the portion of the fiber holder received within the interface.

10. (Unchanged) The apparatus of Claim 1, wherein the fiber holder comprises a substantially spherical member and a substantially cylindrical member, the spherical member and cylindrical member having respective central axes, and a channel of sufficient diameter to receive the optical fiber is located along the respective central axes.

11. (Amended) The apparatus of Claim 1, wherein the fiber holder comprises a substantially spherical portion having a center and a channel of sufficient dimension to receive the optical fiber, the channel located through the center of the substantially spherical portion.

12. (Unchanged) The apparatus of Claim 1, wherein the fiber holder is secured to the interface by a radial press interference fit.

13. (Unchanged) The apparatus of Claim 12, wherein the interface is distended by the insertion of the fiber holder to provide a radial press interference fit.

14. (Unchanged) The apparatus of Claim 1, wherein the fiber holder is secured to the interface by polymeric bonding.

15. (Unchanged) The apparatus of Claim 1, wherein the fiber holder is welded in place inside the interface.

16. (Unchanged) The apparatus of Claim 1, wherein the fiber holder has a non-circular profile to provide discrete contact points between the fiber holder and the interface.

17. (Amended) The apparatus of Claim 1, further comprising:

a heat sink;

the second end further comprises a second open end to receive at least a portion of a heat sink through the second open end, wherein the heat sink is securable to the interface by polymeric bonding.

18. (Amended) The apparatus of Claim 17 wherein the heat sink has a cylindrical shape and comprises a plurality of bores that contain polymeric bonding material that secures the heat sink to at least a region of the second end when at least a portion of the heat sink is received by the interface through the second open end.

C' Cont.

19. (Amended) The apparatus of Claim 17, wherein the heat sink further comprises at least one capillary gap, the capillary gap holding bonding material that secures the heat sink to the interface when a portion of the heat sink is brought into contact with the interface.

20. (Amended) The apparatus of Claim 1, further comprising:

a heat sink;

the second end further comprises a second open end to receive at least a portion of the heat sink through the second open end, wherein the at least a portion of the heat sink is welded in place inside the interface.

21. (Amended) The apparatus of Claim 1, further comprising:

a heat sink;

the second end further comprises a second open end to receive at least a portion of the heat sink through the second open end, wherein the at least a portion of the heat sink is press fit inside the interface.

22. (Amended) The apparatus of Claim 1, further comprising:

a heat sink;

the second end further comprises a second open end to receive at least a portion of the heat sink through the second open end, wherein the fiber holder, heat sink, and interface are secured to a clamping block.

23. (Unchanged) The apparatus of Claim 22, wherein the clamping block encloses the fiber holder, heat sink, and interface.

24. (Unchanged) The apparatus of Claim 22, wherein the fiber holder, heat sink, and interface are strapped on top of the clamping block.

25. (Amended) The apparatus of Claim 1, wherein the interface includes at least one access slot allowing access to at least a portion of the fiber holder received by the interface such that the fiber holder can be aligned through the at least one access slot.

26. (Amended) An interface structure for aligning and holding in alignment a laser diode and an optical fiber tip, the interface having a central axis of rotation and allowing translational movement along at least three axes including a X and Y axes and the central axis, the interface structure including a first open end dimensioned to receive at least a portion of a fiber tip holder and dimensioned to achieve a radially extending interference press fit that retains the fiber tip holder, and a second open end dimensioned to receive at least a portion of a heat sink coupled with the laser diode such that the translational movement of the fiber holder along the at least three axes is such that the optical fiber tip is positionable to receive light emitted by the laser diode.

27. (Unchanged) The interface structure of Claim 26, wherein the interface has a substantially cylindrical structure and said cylindrical shape of the structure comprises a center portion, wherein the center portion distends to receive the fiber holder in a press fit.

28. (Amended) The interface structure of Claim 27, wherein the center portion is slightly deformed to have a noncircular cross section.

29. (Unchanged) The interface structure of Claim 26, further comprising a plurality of access slots located proximate to the first end and extending parallel to the central axis.

30. (Unchanged) The interface structure of Claim 26, further comprising an access slot located proximate to the second end to provide access for an electrode to be attached to the laser diode.

37. (Amended) A method for aligning a light source with an optical fiber having a tip using translational movement along three perpendicular axes including a X and Y axes and a central axis, and a rotational movement about the central axis such that when light is emitted from the light source the light is transmitted to the tip of the optical fiber, the method comprising:

placing at least a region of the optical fiber adjacent the tip in an optical fiber holder, the fiber holder of suitable dimension to fit within a substantially tubular member having a central axis;

inserting the optical fiber holder and at least the tip of the optical fiber within the tubular member;

inserting the light source within the tubular member such that the light source;

manipulating the tip in any combination of at least a first axis of the three perpendicular axes to to position the tip to be in substantial alignment with the central axis; and

manipulating the tip in any combination of at least a second axis of the three perpendicular axes to position the light source to be in substantial alignment with the central axis, such that the tip is positioned to receive light emitted by the light source.

38. (Unchanged) The method of Claim 37, further comprising attaching a heat sink to the light source.

39. (Unchanged) The method of Claim 38, wherein inserting the light source within the tubular member comprises press fitting the heat sink carrying the light source to the tubular member .

40. (Unchanged) The method of Claim 37, wherein inserting the fiber holder within the tubular member comprises press fitting the fiber holder into the tubular member to create a radial interference fit.

41. (Unchanged) The method of Claim 37, wherein inserting the fiber holder within the tubular member further comprises welding the fiber holder to the tubular member.

42. (Unchanged) The method of Claim 37, wherein inserting the fiber holder within the tubular member further comprises bonding the fiber holder to the tubular member.

43. (Unchanged) The method of Claim 37, wherein inserting the heat sink within the tubular member further comprises welding the heat sink to the tubular member.

44. (Unchanged) The method of Claim 37, wherein inserting the heat sink within the tubular member further comprises bonding the heat sink to the tubular member.

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45. (Unchanged) The method of Claim 38, further comprising placing the tubular member, light source, optical fiber, and heat sink in a clamping block.

46. (Amended) An apparatus for actively aligning an optical fiber tip to receive light emitted by a light source relative to any one or combination of three perpendicular axes including a X and Y axes, and a central axis, comprising:

a fiber holder having a substantially spherical portion having a center and a channel of sufficient dimension to receive a tip at an end of the optical fiber, the channel located through the center of the substantially spherical portion of the fiber holder;

a heat sink;

a substantially tubular interface having a central axis along its center, a first open end and a second open end, the interface receiving the fiber holder through the first open end along the central axis and creating a radially directed interference press fit with the fiber holder such that the fiber holder can be adjusted relative to the X and Y axes, and the interface receiving the heat sink through the second open end, the fiber holder receiving and holding an optical fiber and aligning the tip with the central axis; and

a laser diode aligned with the central axis and placed within the interface between the heat sink and the fiber holder, the laser diode attached to the heat sink such that heat generated from operation of the laser diode is drawn by the heat sink.

47. (Amended) The apparatus of claim 1, wherein the interface allows alignment to an arbitrary level of alignment accuracy between the tip and the light source.

48. (Amended) The apparatus of claim 1, wherein the interface allows a six-axis alignment to an arbitrary level of alignment accuracy between the tip and the light source.

49. (Amended) The apparatus of claim 1, wherein the alignment includes x-axis, y-axis, and z-axis translation, and θ-angular rotation.

50. (Amended) The apparatus of claim 1, wherein the alignment comprises an active alignment for achieving a position tolerance smaller than a machined tolerance of the fiber holder and the interface.

51. (Unchanged) The apparatus of claim 1, further comprising a heat sink and wherein the interface further having a second open end and receiving the heat sink through the second open end.

C1 Cont

52. (Unchanged) The apparatus of Claim 1, wherein the fiber holder is secured to and aligned with the interface along an x-axis and a y-axis by a radial press interference fit.

53. (Unchanged) The apparatus of Claim 14, wherein the polymeric bonding comprises wicking an inorganic polymeric bonding material between said fiber holder and said interface and hardening said polymeric bonding material to lock said aligned structure.

54. (Unchanged) The apparatus of Claim 14, wherein the polymeric bonding comprises an organic polymer.

55. (Unchanged) The apparatus of Claim 14, wherein the polymeric bonding comprises an inorganic polymer.

56. (Unchanged) An interface structure as in claim 26, wherein the interface has a substantially cylindrical shape.

57. (Unchanged) An interface structure as in claim 26, wherein the interface has a substantially non-cylindrical shape.

58. (Amended) The interface structure of claim 26, wherein the interface structure allows alignment to an arbitrary level of accuracy.

59. (Amended) The interface structure of claim 26, wherein the interface structure allows a six-axis alignment to an arbitrary level of accuracy.

60. (Amended) The interface structure of claim 26, wherein the alignment includes x-axis, y-axis, and z-axis translation, and θ-angular rotation.

61. (Amended) The interface structure of claim 26, wherein the alignment comprises an active alignment for achieving a position tolerance smaller than a machined tolerance of the fiber holder and the interface.

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62. (Unchanged) The interface structure of Claim 26, wherein at least some of said plurality of access slots provide aperture for applying adhesive to secure an aligned assembly.

63. (Unchanged) The interface structure of Claim 26, further comprising an access slot located proximate to the second end to provide access for a radially extending electrode to be attached to the laser diode and provide a low-height assembly.

C2

64. (New) An apparatus for actively aligning an optical fiber tip with a laser diode relative to any one or combination of movement along three perpendicular axes and a rotational movement, comprising:

a fiber holder having a substantially spherical portion having a center and a channel of sufficient dimension to receive the tip at an end of the optical fiber, the channel located through the center of the substantially spherical portion of the fiber holder;

a heat sink;

a substantially tubular interface having a central axis along its center, a first open end and a second open end, the interface receiving the fiber holder through the first open end and creating a radially directed interference press fit with the fiber holder and receiving the heat sink through the second open end, the fiber holder receiving and holding at least a portion of an optical fiber and aligning the optical fiber with the central axis; and

a laser diode aligned with the central axis and placed within the interface between the heat sink and the fiber holder, the laser diode attached to the heat sink such that heat generated from operation of the laser diode is drawn by the heat sink.

65. (New) An apparatus to align an optical fiber with a light source, comprising:

a fiber holder to retain a portion of the optical fiber;

a substantially tubular member having a longitudinal axis, a first end of said tubular member defining an opening sized to receive a portion of said fiber holder, a second end of said tubular member positionable to receive light emitted by the light source; and

wherein said fiber holder is movable along said longitudinal axis such that a distal end of said optical fiber is positionable along a plane defined by and within said second end.

66. (New) The apparatus of claim 65, wherein a movement along said plane represents movement along a x-axis and a y-axis.

67. (New) The apparatus of claim 66, wherein said fiber holder is rotatable about said longitudinal axis.

68. (New) The apparatus of claim 67, wherein the optical fiber includes a nonsymmetrical distal end and rotation of said fiber holder about said longitudinal axis aligns the nonsymmetrical distal end with respect to the light source.

69. (New) The apparatus of claim 68, wherein the optical fiber includes a noncircular distal end and rotation of said fiber holder about said longitudinal axis aligns the noncircular distal end with respect to the light source.